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Applicant:	Neil RICHARDS, Gajinder Singh PANESAR, John CAREY, and Peter THOMPSON
Serial No:	09/413,644
Filed:	October 6, 1999
For:	DATA TRANSMISSION APPARATUS FOR TRANSMITTING ATM DATA STREAMS (formerly DATA TRANSFER)
Examiner:	Justin M. Philpott
Art Unit:	2665 Conf. No.: 2260

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

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Eileen MacKenzie

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Sir:

Transmitted herewith for filing are the following documents:

[X] Appellants' Brief Pursuant to 37 C.F.R. §41.37

[X] Return Receipt Postcard

If the enclosed papers are considered incomplete, the Mail Room and/or the Application Branch is respectfully requested to contact the undersigned collect at (617)720-3500, Boston, Massachusetts.

A check in the amount of $500.00 is enclosed to cover the filing fee for the Appellants' Brief. Please credit any overpayment or charge any deficiency in the enclosed fee to the account of the undersigned, Deposit Account No. 23/2825. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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APPELLANTS' BRIEF PURSUANT TO 37 C.F.R. §41.37

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Appendix A (37 C.F.R. §41.37(c)(1)(viii)— Claims As Pending

This brief is in furtherance of the Notice of Appeal mailed on December 1, 2004 and received by the PTO on December 6, 2004. Thus, the Notice of Appeal was filed on December 6, 2004. A check for the fee required under 37 C.F.R. §41.20(b)(2) is submitted herewith.

I. REAL PARTY IN INTEREST (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in this application is the assignee, ST Microelectronics Limited, a corporation having a place of business at 1000 Aztec West, Almondsbury, Bristol BS12 4SQ, United Kingdom.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. §41.37(c)(1)(ii))

There are no other appeals or interferences known to the Appellants, the Appellants' legal representative, or the assignee which will directly affect, be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. §41.37(c)(1)(iii))

There are 17 total claims in this application (3 independent claims and 14 dependent claims). The appealed claims are set forth in Appendix A. The following summarizes the status of the claims:

1. Claims pending and appealed: 1, 3-5, and 8-20
2. Claims rejected: 1, 3-5, and 8-20
3. Claims allowed: none
4. Claims withdrawn from consideration: 2, 6, and 7
5. Claims canceled: 2, 6, and 7

IV. STATUS OF AMENDMENTS (37 C.F.R. §41.37(c)(1)(iv))

An amendment was mailed on October 1, 2004 in response to the Final Office Action mailed June 1, 2004. The purpose of the amendment was to correct the dependencies of claims 8-10 so that these claims no longer depend from a cancelled claim, to summarize on the record

the substance of the telephone interview conducted with the Examiner on October 1, 2004, and to respond to statements in the Final Office Action mailed June 1, 2004.

An Advisory Action was mailed on November 26, 2004 in response to Appellants' amendment of October 1, 2004. The Advisory Action failed to indicate whether the Examiner had entered the amendments to claims 8-10 made in the October 1, 2004 amendment. For the purposes of this appeal, Appellants have assumed that the amendment was entered since the amendment did no more than correct the dependencies of claims 8-10 and since the Advisory Action was silent as to entry of the amendment.

V. SUMMARY OF CLAIMED SUBJECT MATTER (37 C.F.R.§41.37(c)(1)(v))

In one aspect, the invention relates generally to the transfer of data, such as the transmission of multiple data messages over a single transmission medium. Specification, page 1, lines 1-2. For each data stream to be transmitted over a data channel, a scheduling variable that indicates a scheduled transmission timing for that data stream is stored in a data stream control memory. At substantially constant time intervals, a data stream selector compares the scheduling variables in the memory to the current time, which is maintained by a clock, and selects the scheduling variable indicative of the earliest scheduled transmission time that is not earlier than the current time. The data stream selector then generates an indication of the data stream that corresponds to the selected scheduling variable and increments the scheduling variable (i.e., so that it reflects the next transmission time for that data stream). The indication of the data stream generated by the data stream selector is received by a data transmission unit which transmits a portion of the data from the data stream over the data channel. *See* Claim 1.

In another aspect, the data stream control memory may also store, for each data stream, an increment variable. When the data stream selector increments the selected scheduling variable, it accomplishes this task by adding the increment variable to the selected scheduling variable. *See* Claim 19.

In another aspect, the system further includes a data transmission controller that is capable of overriding the selection of the data stream selector and provides the data transmission unit an indication of a data stream from which to transmit an amount of data. *See* Claim 20.

One embodiment in accordance with the above aspects of the invention is described in Appellants' specification, primarily at page 20, line 1 to page 22, line 7. A summary of this embodiment is provided below, by way of example only, and is not intended to limit the claims. For the sake of convenience, Appellants have indicated parenthetically which claim elements correspond to certain features of the embodiment described at pages 20-22 of the specification. Appellants emphasize that these parenthetical notations are in no way intended to limit the claims to the specific example provided below.

In one embodiment, multiple data streams may be segmented and transmitted along a link as asynchronous transfer mode (ATM) cells. Specification, page 7, lines 5-6. A context memory ("data stream control memory") holds information used in the segmenting of cells for each message channel ("data stream") to be transmitted. Specification, page 17, lines 26-30. For each data stream, a "next time" value ("scheduling variable") is stored in the context memory which indicates the next time at which it is intended that data should be transmitted from the corresponding message channel. Specification, page 20, lines 6-8. The context memory also stores an "interval" value ("increment variable") for each message channel, which indicates the intended time period between transmission of cells from the message channel. Specification, page 20, lines 8-10.

Using a "current time" clock, a pacing engine ("data stream selector") may, at programmable time intervals (e.g., every ten microseconds), scan the context memory to identify the message channel whose corresponding "next time" value indicates the earliest time that is not earlier than the current time (i.e., the data stream which is most overdue for transmission). Specification, page 20, lines 23-26. A cell from the identified message channel may be sent and the "next time" value corresponding to that message channel may be updated by adding the "interval" value to the current "next time" value for that message channel. Specification, page 21, lines 1-3.

In some circumstances it may be necessary to have direct control over the time at which cells are to be transmitted. Specification, page 21, lines 28-29. To achieve this, the processor ("data transmission controller") can disable selection of data streams by the pacing engine ("data stream selector") and can instead insert messages (i.e., cells) itself for transmission, which results in the message being sent immediately. Specification, page 21, lines 29-32.

The foregoing Summary of the Claimed Subject Matter is provided merely to assist the Board in appreciating various aspects of the present invention. However, all of the discussion in the summary does not apply to each of the independent claims on appeal, and the language of the independent claims may differ in material respects from the summary provided above. Thus, the Board is respectfully requested to give careful consideration to the language of each of the independent claims and to address each on its own merits, without relying on the summary provided above. In this respect, Appellants do not rely on the summary provided above to distinguish any of the claims of the present invention over the prior art, but rather, rely only upon the arguments presented below.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R.§41.37(c)(1)(vi))

The sole grounds of rejection to be reviewed on appeal is the rejection of claims 1, 3-5, and 8-20 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,533,020 to Byrn et. al. (hereinafter "Byrn").

VII. ARGUMENT (37 C.F.R. §41.37(c)(1)(vii))

For the reasons discussed below, the rejection of claims 1, 3-5, and 8-20 under 35 U.S.C. §103(a) as being unpatentable over Byrn is improper and should be reversed.

A. Discussion of Byrn

1. Background of the Problem Addressed by Byrn

Byrn is directed to scheduling the transmission of cells in a number of data streams over a common communications link (Col. 1, lines 5-7). Byrn discloses that in a packet based communication network, such as an Asynchronous Transfer Mode (ATM) network, there may be multiple virtual connections (VCs) through each physical communication link. Column 1, lines 10-12. Consequently, packets or cells that belong to different virtual connections may be interleaved as they are transmitted on the shared communications link. Column 1, lines 12-14. Byrn further discloses that transmission of cells in this manner allows a service provider to provide negotiated quality of service (QOS) parameters, such as an average transmission rate (i.e., the mean time between transmission of consecutive cells from the same VC), a peak transmission rate (i.e., the minimum time allowed between the transmission of consecutive cells from the same VC), and interval over which data may be transmitted at peak rate (i.e., the "maximum credit" or the maximum number of consecutive cells that may be transmitted from a VC at the peak rate). Column 1, lines 30-44; column 4, lines 7-16.

When a service provider and an end user agree on a set of QOS parameters, it is important to guarantee that the agreed upon parameters are not violated. Column 1, lines 44-47. When many sessions (i.e., virtual connections) are established over a shared network link, a complex scheduling problem arises, wherein it must be determined when and how frequently to transmit a cell from each session without violating the negotiated QOS parameters for each session. Column 1, lines 47-50. This problem becomes even more complex when there are a large number of sessions and each session has different negotiated QOS parameters. Column 1, lines 51-55.

2. Purpose of the System Disclosed by Byrn

The purpose of the system of Byrn is to maintain the accurate scheduling of cells in situations where there are a large number of virtual connections that have different negotiated QOS parameters, while keeping the amount of processing required to a minimum. Column 2, line 66 – Column 3, line 3. Indeed, Byrn discloses that among the advantages of the disclosed

techniques are "[allowing] simple insertion of cells into queues based on priority, rate, and [target transmission time]" and "[enabling] the scheduling of cells with a wide range of transmission rates." Column 3, lines 4-9.

3. Description of the System of Byrn

Byrn discloses using a cell scheduling unit (CSU) to schedule a cell for transmission at a future time. Column 4, lines 33-34. The CSU, shown in Figure 4 of Byrn, includes *n* banks, each having a plurality of circular queues. Column 4, lines 36-37. Each bank in the CSU corresponds to a priority level and is assigned a priority, *p*. Column 4, lines 37-38. Each circular queue (referred to as a "timing wheel") is assigned a wheel rate, *r*, so that different wheel rates may be used to support different VC transmission requirements. Column 4, lines 39-45. Thus, each timing wheel can be identified by an identifier W*p*,*r*, where *p* identifies the bank in which the wheel resides, and *r* identifies the wheel rate. Column 4, lines 38-39.

Each cell that is to be transmitted is assigned a target transmission time (TTT), which may be determined based on the current transmission time (CTT), which represents the current value of the transmission clock, the last cell transmission time (LCTT), which represents the last time at which a cell from the same virtual connection was transmitted, and the negotiated QOS parameters (i.e., average transmission rate, peak transmission rate, and maximum credit). Column 4, lines 3-5; column 4, lines 16-22.

Additionally, a priority value, *p*, is assigned to each cell based on the negotiated QOS parameters for a virtual connection and a wheel rate, *r*, is assigned to each cell based on the previously determined TTT for the cell. Column 4, lines 53-59. The cell may then be placed into one of the timing wheels Wp,r based on the assigned values of *p* and *r* and may be placed into a specific slot within the timing wheel based on its assigned TTT. Column 4, line 60 – Column 5, line 1.

A cell is selected for transmission as shown in Figure 5 of Byrn. Initially, the current position of the timing wheel corresponds to the current transmission time (CTT). Column 5, lines 4-5. First, each timing wheel that has one or more cells scheduled for transmission at the current time (i.e., located at the current position of the timing wheel) is selected. Column 5, lines

29-33. If multiple timing wheels are selected, then the timing wheels with the highest priority are selected first. Column 5, lines 33-34. If there are multiple timing wheels with the same priority that have cells located at the current position, then the wheel with the highest wheel rate is selected first. Column 5, lines 34-35. Once a wheel is selected, all cells that are located at the current position of the wheel are transmitted in first come-first served order. Column 5, lines 35-37.

B. Summary of the Examiner's Rejection

The Examiner rejected claims 1, 3-5, and 8-20 under 35 U.S.C. §103(a) as being unpatentable over Byrn. *See* Final Office Action mailed June 1, 2004 (hereinafter "Final Office Action), page 4. The Examiner asserts that Byrn discloses a scheduling variable in the form of a priority, *p*, and wheel rate, *r*, and that this scheduling variable is incremented when the wheel corresponding to the priority, *p*, and the wheel rate, *r*, (i.e., Wp,r) is incremented. Final Office Action, page 5, lines 2-4. The Examiner further asserts that Byrn discloses a data stream selector, in the form of the Cell Scheduling Unit that compares the purported scheduling variable (i.e., Wp,r) for each data stream and selects the scheduling variable indicative of the earliest scheduled transmission timing. Final Office Action, page 5, lines 8-11.

The Examiner concedes that the purported comparison of scheduling variables performed by the Cell Scheduling Unit of Byrn does not occur at substantially constant time intervals, as required in each of Applicants' independent claims (i.e., claims 1, 19, and 20). Final Office Action, page 6, lines 1-3. However, the Examiner asserts that if the Cell Scheduling Unit of Byrn were modified so that instead of having a plurality of priority banks, with each priority bank having a plurality of timing wheels of different wheel rates, and the Cell Scheduling Unit did not support multiple priority levels and only supported a single wheel rate, then the comparison of scheduling variables would occur at substantially constant time intervals. Final Office Action, page 6, lines 11-18.

If the Cell Scheduling Unit of Byrn were modified so that there are not different priority levels for timing wheels and there is only one wheel rate for timing wheels, then there is only

one possible value of Wp,r, and consequently, only one timing wheel in the Cell Scheduling Unit. In summary, the Examiner asserts that if one were to modify the Cell Scheduling Unit of Byrn to have only a single timing wheel, then comparison of scheduling variables would occur at a substantially constant time intervals. The Examiner asserts that it would have been obvious to one of ordinary skill in the art to implement the system of Byrn with a single wheel rate and priority in order to avoid experiencing undesirable jitter as implied by Byrn at Column 5, lines 23-27.

C. The Examiner's Rejection is Improper

MPEP §2142 states, "[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." The Manual of Patent Examining Procedure §2142, pg. 2100-128, 8th Edition, Revision 2 (2004).

The rejection of the claims under 35 U.S.C. §103 is improper as the Examiner has failed to establish a *prima facie* case of obviousness. Specifically, there is no motivation or suggestion to modify the reference in the manner proposed by the Examiner and, even if one were to modify Byrn in the manner proposed in the Office Action, the claims patentably distinguish over the system of Byrn, incorporating the modifications proposed by the Examiner.

1. Lack of Motivation

One of skill in the art would not have been motivated to modify Byrn in the manner suggested in the Office Action, because the proposed modification would render the prior art invention unsatisfactory for its intended purpose and would change the principle of operation of Byrn.

a. *The Proposed Modification to Byrn Would Render the Invention Unsatisfactory for its Intended Purpose.*

If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. The Manual of Patent Examining Procedure §2143.01, pg. 2100-131, 8th Edition, Revision 2 (2004); In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

In Gordon, appellants filed a patent application directed to a blood filter assembly used during surgery to filter certain substances from a patient's blood before returning the blood to the patient's body. Gordon, 733 F.2d at 901, 221 USPQ at 1126. The sole prior art reference relied upon was a patent to French, which disclosed a liquid strainer for removing dirt and water from gasoline and other light oils. Gordon, 733 F.2d at 901, 221 USPQ at 1127. Both the inlet and outlet of the French device are at the top end of the device and a continuous helical tooth imparts a whirling motion on the incoming liquid, guiding unwanted dirt and water downwardly into a pocket in the bottom of the device. Gordon, 733 F.2d at 901-902, 221 USPQ at 1127. The Board of Patent Appeals found appellants' claims unpatentable on the theory that it would have been obvious to turn the prior art device upside down. Gordon, 733 F.2d at 902, 221 USPQ at 1127. The Gordon court overturned the finding of obviousness, reasoning that if the prior art device were turned upside down, the device would be rendered inoperable for its intended purpose. Id. Specifically, the court stated that, "French teaches a liquid strainer which relies, at least in part, upon the assistance of gravity to separate undesired dirt and water from gasoline and other light oils. Therefore, it is not seen that French would have provided motivation to one of ordinary skill in the art to employ the French apparatus in an upside down orientation." Id.

Similarly, in the present application, the Examiner's proposed modification to Byrn would render the invention of Byrn inoperable for its intended purpose. As discussed above, the Examiner proposes to modify Byrn so that there is only a single timing wheel (Wp,r) in the Cell Scheduling Unit. As a result, only one transmission rate (*r*) and one priority (*p*) would be supported by the Cell Scheduling Unit. As further discussed above, the purpose of the system of

Byrn is to schedule transmission of cells from a large number of virtual connections that have different negotiated quality of service parameters. To accomplish this, Byrn employs multiple timing wheels having different priority levels and different wheel rates. This allows cells to be placed in timing wheels that will satisfy the QOS parameters for the cells' virtual connections.

As in Gordon, where operating the liquid strainer device in an upside down orientation rendered the device inoperable to strain liquids, using only a single timing wheel in the Cell Scheduling Unit of Byrn would render the system inoperable to schedule the transmission of cells from a plurality of different virtual connections that have different QOS parameters.

Accordingly, because the proposed modification to Byrn would render the system of Byrn unsatisfactory for its intended purpose, there is no motivation to make such a modification. Therefore, the rejection of claims under 1, 3-5, and 8-20 under 35 U.S.C. §103 is improper and should be reversed.

b. *The Proposed Modification to Byrn Would Change the Principle of Operation of the Invention.*

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. The Manual of Patent Examining Procedure §2143.01, pg. 2100-132, 8th Edition, Revision 2 (2004); In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

In Ratti, appellant's claims were directed to an oil seal for insertion in a cylindrical bore, comprising a sealing ring having an outer bore engaging portion formed of resiliently deformable material. Ratti, 270 F.2d at 810, 123 USPQ at 350. The primary reference relied upon in a rejection based on a combination of references disclosed a housing provided with a bore surrounding a centrally located shaft. Ratti, 270 F.2d at 811, 123 USPQ at 350. A sealing member is press fitted into the space between the bore and the shaft, wherein the bore engaging portion of the sealing member is stiffened by a cylindrical sheet metal casing that acts as a reinforcing member. Id. Thus, the primary reference taught that the device required rigidity for

operation, whereas the claims required resiliency. Id. The court reversed the obviousness rejection holding that the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which [the primary reference] construction was designed to operate." Ratti, 270 F.2d at 812, 123 USPQ at 352.

In the present application, the Examiner proposes a modification to Byrn that would change the principle of operation of the invention. The invention was designed to support multiple virtual connections by providing a plurality of timing wheels with various priorities and wheel rates. However, the modification proposed by the Examiner reduces the number of timing wheels in the system to a single wheel having a fixed wheel rate.

Indeed, Byrn discloses that one of the advantages of the invention is to "enable the scheduling of cells with a wide range of transmission rates." Byrn, Column 3, lines 7-8. If the Cell Scheduling Unit of Byrn were to have a single wheel rate, the system would be incapable of scheduling cells with a wide range of transmission rates, thereby changing a fundamental principle of operation of the system of Byrn. As in Ratti, where the court held that a substitution of a resilient sealing member in place of a rigid sealing member constituted a substantial reconstruction and redesign of elements and a change in the basic principle of operation, modifying Byrn to include only a single timing wheel in the Cell Scheduling Unit also constitutes a substantial redesign of elements and a change in the basic principle of operation.

Accordingly, for this additional reason, the rejection of claims under 1, 3-5, and 8-20 under 35 U.S.C. §103 is improper and should be reversed.

2. The Claims Patentably Distinguish Over Byrn

Even if one of skill in the art would have been motivated to modify Byrn as proposed by the Examiner, the claims patentably distinguish over the modified system of Byrn.

a. Claim 1

Contrary to the Examiner's assertions, the modified Byrn system does not include a scheduling variable, stored in a data stream control memory, that is indicative of a scheduled

transmission time for a data stream, nor a data stream selector for, at substantially constant time intervals, comparing the scheduling variables stored in the memory and selecting the scheduling variable indicative of the earliest scheduled transmission timing and, if that scheduled transmission timing is not earlier than the current timing, generating an indication of the data stream corresponding to the selected scheduling variable and incrementing the selected scheduling variable, as required by claim 1.

As discussed above, the Examiner asserts that Byrn discloses a scheduling variable in the form of a priority, *p*, and wheel rate, *r*, and that this scheduling variable is incremented when the wheel corresponding to the priority, *p*, and the wheel rate, *r*, (i.e., Wp,r) is incremented. Final Office Action, page 5, lines 2-4.

However, in the modified Byrn system there are no priority levels and only a single wheel rate. Thus, the priority value, *p*, does not exist in the modified Byrn system and the wheel rate, *r*, is fixed. Therefore, the wheel rate, *r*, (i.e., the purported scheduling variable) is not representative of scheduled transmission time as claimed. Because there is only a single timing wheel, the same wheel rate, *r*, is assigned to all cells. In this respect, if the wheel rate, *r*, is considered to be a "scheduling variable being indicative of a scheduled transmission timing," as recited in claim 1, all cells would have the same wheel rate, implying that all cells are scheduled for transmission at the same time. Because all cells cannot be transmitted at the same time, the wheel rate, *r*, of Byrn cannot be considered a scheduling variable that is indicative of scheduled transmission timing.

Further, because the wheel rate is fixed (as there is only a single timing wheel in the system), the wheel rate cannot be incremented. Thus, the modified Byrn system does not include a data stream selector for "incrementing the selected scheduling variable," as recited in claim 1.

Additionally, even if the wheel rate, *r*, is considered to be a scheduling variable, Byrn does not disclose a data stream selector that "at substantially constant time intervals" compares the purported scheduling variables. In the modified Byrn system there is only a single wheel rate, *r*, and no other wheel rates with which the single wheel rate can be compared.

In the Advisory Action mailed November 26, 2004, the Examiner claims to have proposed two ways by which Byrn may provided a substantially constant time interval and that "applicant has responded with arguments pertaining to the second...However, applicant has not addressed the first, more obvious way by which Byrn provides a 'substantially constant' time interval." November 26, 2004 Advisory Action. Specifically, the Examiner asserts that Appellants have failed to address the assertion that because Byrn provides for different wheel rates, each wheel rate is a fixed amount. Thus, the Examiner asserts that Byrn provides a "substantially constant time interval." November 26, 2004 Advisory Action.

This argument is unclear for several reasons. First, as discussed above, the Examiner has proposed to modify Byrn to include only a single timing wheel in the system. It is unclear whether the Examiner now asserts that Byrn provides a "substantially constant time interval" without making the proposed modification to Byrn.

Further, Appellants do not deny that each timing wheel in the Byrn system shifts at a fixed rate. However, claim 1 requires a data stream selector that "at substantially constant time intervals, [compares] the scheduling variables stored in the memory." While the Examiner asserts that the wheel rates shift at a substantially constant time interval, he does not specify what comparison of scheduling variables takes place at this substantially constant time interval. Thus, Appellants are unclear, under this interpretation, as to: 1) what feature in the system of Byrn the Examiner believes is a scheduling variable; and 2) where Byrn discloses that scheduling variables are compared.

In summary, Byrn fails to disclose or suggest a "scheduling variable for each data stream, each scheduling variable being indicative of a scheduled transmission timing for that data stream," as recited in claim 1. The wheel rate, *r,* cannot be considered such a scheduling variable because it is not indicative of scheduled transmission timing. Further, the wheel rate, *r,* is fixed, as the Examiner concedes, and thus is not incremented by a data stream selector, as further required by claim 1. Thus, claim 1 patentably distinguishes over Byrn. Accordingly, the rejection of claim 1 and the claims that depend therefrom is improper and should be reversed.

b. Claim 19

As should be clear from the discussion above, Byrn fails to disclose or suggest a scheduling variable as recited in claim 19. Further, there is no disclosure in Byrn of an increment variable, wherein a selected scheduling variable may be incremented by "adding the selected scheduling variable to the increment variable," as recited in claim 19.

The Final Office Action asserts that, with respect to claim 19, the current position of the timing wheel in Byrn represents the scheduling variable and the wheel rate, *r*, represents the increment variable. Nowhere does Byrn indicate that the wheel rate, *r*, is added to the current position of the timing wheel. Rather, Byrn discloses that the current position of the timing wheel is incremented based on the current transmission time (CTT). Byrn, column 5, lines 4-12. For example, if the wheel rate of the timing wheel is 1, then the wheel may shift at a rate of one slot per cell time (i.e., the time needed to transmit a single cell) and if the wheel rate of the timing wheel is 0.1, then the wheel may shift at a rate of one slot per ten cell times. Byrn, column 4, lines 42-46. As discussed above, a cell time is tracked by the CTT, which is incremented after a cell is transmitted or the time to transmit a single cell at the link speed has elapsed. Byrn, column 5, lines 22-25. Thus, the wheel rate is not added to the current position of the timing wheel, as the Examiner asserts. Rather, the wheel rate is used to determine whether the timing wheel shifts when the CTT is incremented. The Examiner's assertion that the wheel rate, *r*, is added to the current position of the timing wheel (i.e., the purported scheduling variable) is not based on the teachings of Byrn. Accordingly, the rejection of claim 19 is improper and should be reversed.

c. Claim 20

As should be clear from the discussion above, Byrn fails to disclose a scheduling variable, as recited in claim 20. Further, Byrn does not disclose or suggest, "a data transmission controller operable to override the data stream selector and provide to the data transmission unit an indication of a data stream from which to transmit an amount of data," as recited in claim 20.

The Examiner asserts that Byrn teaches a priority level wherein cells assigned a higher priority level are serviced before other cells. Final Office Action, page 7, lines 4-5. The

Examiner asserts that servicing cells based on their priority level constitutes overriding the selection of a cell to be serviced.

Appellants respectfully submit that the Examiner's interpretation of Byrn is erroneous. The priority levels of Byrn are used to make the initial selection of a timing wheel to be serviced. The priority levels are not used to override a selection of a timing wheel that has been previously made. The priority levels are only used in the initial selection of a timing wheel.

Further, the system of Byrn, as modified by the Examiner, does not include priority levels. Specifically, the Examiner states that," one of ordinary skill in the art would be motivated *not* to include the priority level feature in such a system as implied by Byrn...(emphasis in original)." That is, the Examiner modifies the system of Byrn so that is does not include priority levels, and then uses these priority levels in the rejection of the claims.

Accordingly, the rejection of claim 20 and the claims that depend therefrom is improper and should be reversed.

VII. CONCLUSION

For the foregoing reasons, the rejection of claims 1, 3-5, and 8-20 U.S.C. §103 is improper and should be reversed.

Respectfully submitted,

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APPENDIX A – CLAIMS AS PENDING

1. (Previously Presented) Data transmission apparatus for transmitting data from a plurality of data streams over a data channel, the apparatus comprising:

a data stream control memory for storing a scheduling variable for each data stream, each scheduling variable being indicative of a scheduled transmission timing for that data stream;

a clock for maintaining a current timing indication;

a data stream selector for, at substantially constant time intervals, comparing the scheduling variables stored in the memory and selecting the scheduling variable indicative of the earliest scheduled transmission timing and, if that scheduled transmission timing is not earlier than the current timing, generating an indication of the data stream corresponding to the selected scheduling variable and incrementing the selected scheduling variable; and

a data transmission unit for receiving the indication of the data stream and transmitting an amount of data from that data stream over the data channel.

2. (Cancelled)

3. (Original) Data transmission apparatus as claimed in claim 1, comprising at least one data memory for storing the data streams, and wherein the data transmission unit retrieves the amount of data from the data memory before transmitting it over the data channel.

4. (Original) Data transmission apparatus as claimed in claim 3, wherein:

the data stream control memory stores a pointer variable for each data stream; and

the data transmission unit retrieves the amount of data from the location in the data memory indicated by the pointer variable of the selected data stream.

5. (Previously Presented) Data transmission apparatus as claimed in claim 4, wherein on selecting a data stream the data stream selector increments the pointer variable for that data stream.

6. (Cancelled)

7. (Cancelled)

8. (Previously Presented) Data transmission apparatus as claimed in claim 20, wherein the data transmission unit is responsive to the indication of a data stream provided by the data transmission controller to next transmit data from that data stream.

9. (Previously Presented) Data transmission apparatus as claimed in claim 20, wherein the data transmission controller is operable to disable periodic comparison of the scheduling variables by the data stream selector.

10. (Previously Presented) Data transmission apparatus as claimed in claim 20, wherein the data stream control memory stores an increment variable for each data stream;

to increment the selected scheduling variable the data stream selector adds the selected scheduling variable to the increment variable for the corresponding data stream; and

the data transmission controller is operable to vary the increment variables.

11. (Original) Data transmission apparatus as claimed in claim 1, provided on a single integrated circuit.

12. (Original) Data transmission apparatus as claimed in claim 1, further comprising a central processing unit.

13. (Original) Data transmission apparatus as claimed in claim 12, provided on a single integrated circuit, wherein the central processing unit is provided on the integrated circuit.

14. (Original) Data transmission apparatus as claimed in claim 12, wherein the period between successive comparisons of the scheduling variables is programmable by means of the central processing unit.

15. (Original) Data transmission apparatus as claimed in claim 12, wherein the speed of the said clock is variable by means of the central processing unit.

16. (Original) Data transmission apparatus as claimed in claim 1, wherein the amount of data is 384 bits.

17. (Original) Data transmission apparatus as claimed in claim 1, wherein the amount of data is transmitted together with header information.

18. (Original) Data transmission apparatus as claimed in claim 1, wherein the data transmission unit transmits the amount of data in the form of an ATM cell.

19. (Previously Presented) Data transmission apparatus for transmitting data from a plurality of data streams over a data channel, the apparatus comprising:

a data stream control memory for storing a scheduling variable and an increment variable for each data stream, wherein each scheduling variable is indicative of a scheduled transmission timing for that data stream;

a clock for maintaining a current timing indication;

a data stream selector for, at substantially constant time intervals, comparing the scheduling variables stored in the memory and selecting the scheduling variable indicative of the earliest scheduled transmission timing and, if that scheduled transmission timing is not earlier than the current timing, generating an indication of the data stream corresponding to the selected scheduling variable and incrementing the selected scheduling variable by adding the selected scheduling variable to the increment variable for the corresponding data stream; and

a data transmission unit for receiving the indication of the data stream and transmitting an amount of data from that data stream over the data channel.

20. (Previously Presented) Data transmission apparatus for transmitting data from a plurality of data streams over a data channel, the apparatus comprising:

a data stream control memory for storing a scheduling variable for each data stream, each scheduling variable being indicative of a scheduled transmission timing for that data stream;

a clock for maintaining a current timing indication;

a data stream selector for, at substantially constant time intervals, comparing the scheduling variables stored in the memory and selecting the scheduling variable indicative of the earliest scheduled transmission timing and, if that scheduled transmission timing is not earlier than the current timing, generating an indication of the data stream corresponding to the selected scheduling variable and incrementing the selected scheduling variable;

a data transmission unit for receiving the indication of the data stream and transmitting an amount of data from that data stream over the data channel; and

a data transmission controller operable to override the data stream selector and provide to the data transmission unit an indication of a data stream from which to transmit an amount of data.